REMARKS

Claims 1-12 were presented for rexamination. The Office Action indicates that:

(a) A restriction requirement was made final and Claim 4 was canceled subject to reinstatement should a generic claim be found to be allowable. (Item 1 on Page 2 of the Office Action.)

(b) Claims 5-7 were deemed to be drawn to un-elected species C. (Item 1 on Page 2 of the Office Action.)

(c) Added Claim 10 was deemed to have been drawn to un-elected species B. (Item 1 on Page 2 of the Office Action.)

(d) The term "convex surfaces" in added Claims 11-12 was deemed to constitute "new matter". (Item 1 on Page 2 of the Office Action.)

(e) Claims 5-7 and 9-12 were withdrawn from further consideration as being drawn to a nonelected species. (Item 2 on Page 3 of the Office Action.)

(f) Claims 1, 2 and 8 were rejected under 35 USC 102(b) as being anticipated by US Patent No. 5,196,160 ("Porowski Patent"). (Item 4 on Page 3 of the Office Action.)

(g) Claims 1, 2 and 8 were rejected under 35 USC 102(b) as being anticipated by US Patent No. 5,006,300 ("Jonsson et al. Patent"). (Item 5 on Page 4 of the Office Action.)

(h) Claims 1-3 and 8 were rejected under 35 USC 102(b) as being anticipated by US Patent No. 5,367,768 ("Weems Patent). (Item 6 on Page 5 of the Office Action.)

(i) Additional prior art was made of record but not relied upon. (Item 7 on Page 5 of the Office Action).

Claims 1-3, 5-12 are presented for reconsideration. It is respectfully submitted that application satisfies the statutory requirements of the patent statute. Accordingly, reconsideration of this application in view of the above amendments and the following remarks is requested.

Prior Art Rejections

Preliminarily, the Applicants note that nuclear reactor pressure vessels are susceptible to leaking after years of operation at high pressures and temperatures. In one extreme case, leaking reactor coolant (containing ppm quantities of boric acid) in one nuclear plant ate a hole the size of a man's fist through the carbon steel portion of a reactor pressure vessel head (down to the stainless steel liner) before the hole was detected. As is discussed in the specification, the joints between nuclear reactor pressure vessels and their nozzles inherently delay the leakage from internal welds so that substantial cracking may develop in the welds before the leakage can be detected. The cited prior art patents are illustrative of the prior art and teach structures designed to prevent leakage, which inherently inhibits detection.

The Applicants' improvement is a pressure vessel design that facilitates and not inhibits unhindered leakage and early detection of leaking through nascent cracks in J-groove welds (and associated heat effected zones) before the cracks grow substantially. This permits a possibly deteriorating situation to be evaluated at an early stage. Referring for convenient reference to the preferred embodiment of the Applicants' improved pressure vessel design shown in Figures 4 and

5, nozzles 24 extend through penetrations 28 with an interference fit between the pressure vessel and the nozzles. The Applicants provide one or more grooves 42 in the penetration walls 34. These grooves 42 extend from a countersink 38 containing the weld 36 to the outer surface 26 of a pressure vessel 14. The groove 42 and countersink form an unhindered leak passageway 40 for early detection of seepage. Figures 4 and 5 show a groove 42 that extends radially outwardly of the countersink 38 and has radiused portions 44 (as discussed at page 5, lines 4-5) that inherently form convexly contoured surfaces.

In the pressure vessel design of Claim 1:

(i) "each penetration wall and adjacent penetration nozzle defines a passageway extending therebetween from the circumferential structural weld to the outer surface" of the pressure vessel; and

(ii) "each passageway comprises a groove in the penetration wall or in the penetration nozzle for providing a leak path from the weld to the outer surface".

The cited prior art does not disclose or suggest the passageway of Claim 1. The Porowski Patent teaches the use of grooves 18 filled with weld material 22. The Porowski Patent states at Column 3, lines 9-17:

> "From the above, it can be seen that the weld material in the circumferential grooves 18 and 24 form a barrier that will interrupt communication of cracks between ...the weld 8 with the outer surface of the nozzle extending outwardly above the weld 8. Therefore, leakage of the hot pressurized water within the reactor space to the atmosphere is inhibited." [Emphasis supplied.]

Thus, the Porowski Patent does not teach a design including a leak path from the weld to the outer surface of the pressure vessel.

The Jonsson et al. Patent is not concerned with the leakage of a weld 7 between a pressure vessel 1 and a stub tube 6, but rather between two tubes 4 and 6. In any event, and as may be seen from Figures 1 and 2, the detection of any seepage through a nascent crack in the weld 7 would be delayed by the fit between the pressure vessel and the stub tube. Similarly, detection of any seepage through a nascent crack in the weld 8 would be delayed by the fit between the inwardly extending collar at the top of stub tube 6 and the tube 4. Thus, the Jonsson et al. Patent does not teach the Applicants' groove.

The Weems Patent teaches a crack repair method wherein tubes are rolled against the pressure vessels to prevent leakage, which inherently would inhibit detection. For example, the Weems Patent states at Column 6, beginning at line 64, that:

> "At approximately 60,000 psi stress, surface yielding of the outer diameter of tube 12 along the rolled area 52 is obtained causing the tube outer diameter to conform to surface irregularities of the external wall 16 along bore 14 to seal off leakage. The rolled area 52 creates an interference fit pressure between the outer diameter of the tube 12 and the vessel external wall 16 along the bore 14 in the range of 3,000 to 10,000 psi such that the tube outer diameter and the external wall 16 are maintained in intimate contact along the bore 14 when the vessel is pressurized, heated or cooled thusly sealing off leakage ...." [Emphasis supplied.]

Thus, the rolled areas are not designed to function as leak paths and do not teach the Applicants' grooves.

Claims 2, 3 and 8 are directed to principal aspects of the embodiment of the Applicants' improvement shown in Figures 4 and 5. In particular, Claim 3 is directed at an embodiment where a plurality of grooves axially extend in parallel. The Weems Patent discloses only one rolled area. Thus, the Weems Patent does not teach the structure of Claim 3.

Thus, it is respectfully submitted that the improvement of Claims 1-3 and 8 are not taught by the prior art.

Withdrawn Claims

The Examiner is requested to reconsider the decision to withdraw Claims 5 and 9-12. It is respectfully submitted that Figures 4 and 5 show the subject matter of these claims. Thus, Figures 4 and 5 show a counterbore 38 at the inner surface of a pressure vessel (per Claim 5), a nuclear reactor pressure vessel designed to contain radioactive fuel assemblies (per Claim 9), a groove 42 extending radially of the counterbore 38 (per Claim 10), and grooves 42 having radii 44 which inherently define convex surfaces (per Claims 11 and 12).

It is respectfully submitted that the expression "convex surfaces" as it appears in Claims 11 and 12 does not constitute "new matter" because convex surfaces are inherently disclosed in Figures 4 and 5.

Conclusion

Thus, it is respectfully submitted that Claim 1 and its dependent Claims 2-9 and Claims 10-12 are patentable and that the application satisfies the requirements of the patent statute. Accordingly, allowance of these claims is respectfully solicited.

The Commissioner is authorized to charge any additional fees required by 37 CFR 1.16 or 37 CFR 1.17 as a result of this Reply to Deposit Account No. 50-0947.

Respectfully submitted,

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